THE VERTICAL INTERFEROMETER

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The investigation of the distribution of intensity in spectral lines by interference methods while somewhat laborious as compared with the direct methods, visual or photographic, has the important advantage of freedom from instrumental uncertainties such as arise from optical imperfections,

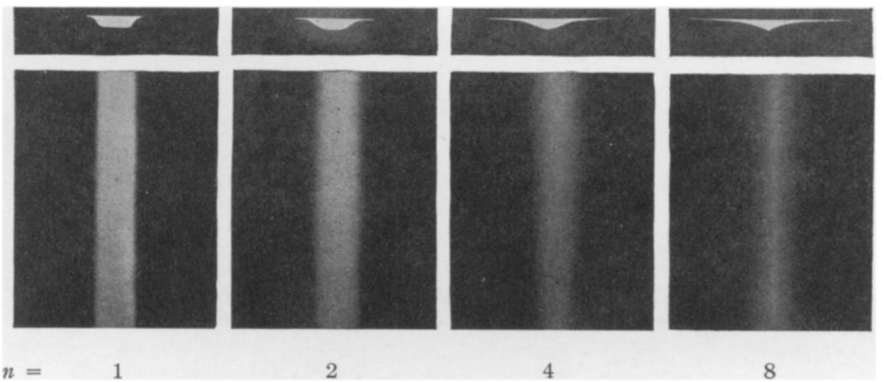

FIG. 1.

finite slit width and diffraction, which are especially objectionable in the case of lines or groups so narrow as to be barely within the resolving power of the spectroscopic appliances employed.

Besides the theoretical value of such investigations as affecting the interpretation of such distribution as based on various assumptions of kinetic theory, effect of temperature, pressure, electric and magnetic fields, a practical application may be mentioned, namely the accurate description of the appearance of spectral lines, which at present are characterized as broad, narrow, diffuse, etc. Thus, for symmetrical lines this distribution may be expressed by $y = 2^{-(x/\Delta)^n}$, in which Δ is the half width of the line and n determines the "square shouldered" character, as illustrated in figure 1.

One of the difficulties in the experimental determination of the visibility of the interference fringes as a function of the difference in path, from which the distribution of intensity may be inferred, is the maintenance of parallelism of the moving mirror, and the vertical interferometer is designed to obviate this objection.

For this the moving mirror is the level surface of mercury in a shallow dish (at least 7 cm. in diameter to avoid curvature due to capillarity).

The tremors of such a surface which would otherwise make observations impossible, are avoided by the simple device of amalgamating the

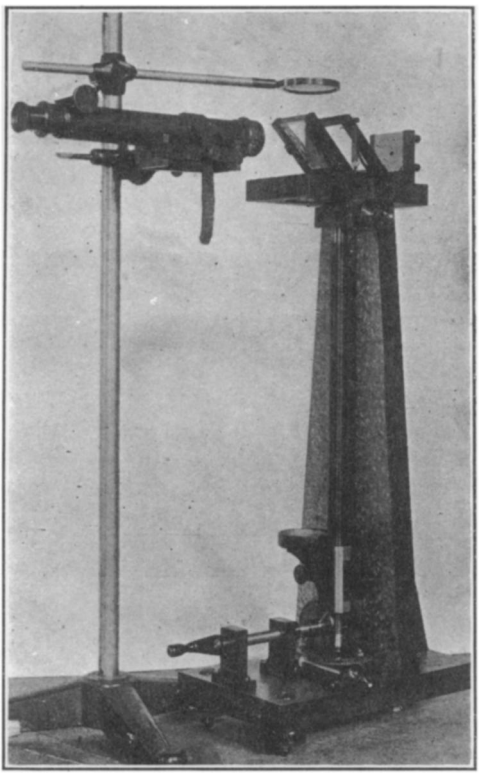

FIG. 2

surface of the shallow dish and covering with a layer of mercury a half millimeter or less in depth, whereby the vibrations are very rapidly extinguished. A photograph of the instrument is shown in figure 2.

ON THE APPLICATION OF INTERFERENCE METHODS TO ASTRONOMICAL MEASUREMENTS

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In order to test the practicability of using an interferometer with large base, for the purpose of measuring close double stars, and possibly the